MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2019/2020

BPO2064 – PRODUCTION & OPERATIONS MANAGEMENT

(All sections / Groups)

28 FEBRUARY 2020

3.00 p.m. – 5.00 p.m.

(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **SIX (6)** pages (including the cover page).

2. Answer **ALL** questions. The marks distributions are given in parentheses.

3. Write all your answers in the **Answer Booklet** provided.

QUESTION 1

(a) A company producing apps for a social networking site is deciding which path to pursue. The first is to create an app that has universal appeal but faces a crowded market. This app, A, would have sales of 100,000 copies at $1 each under ideal conditions, but under tough conditions would have sales of only 60,000 copies at $.80 each. The other app, B, would have sales of 500,000 units at $.50 each under ideal conditions but sales would be reduced to 10,000 units at $.50 each under tough conditions.

(i) Draw the appropriate decision tree.

[4 Marks]

(ii) If ideal and rough conditions occur with the same frequency, which app should the company produce, and explain why the company should produce it? Note: both apps cost the same amount to develop.

[4 Marks]

(b) Raja Ali, the owner of Ali restaurant has tracked the number of meals served at dinner over the last four weeks. The data show little in terms of trends, but do display substantial variation by day of the week. Use the following information to determine the seasonal (daily) indices for Ali restaurant. Based on the seasonal indices how should Ali plan for the next month?

	WEEK			
DAY	1	2	3	4
Sunday	40	35	39	43
Monday	54	55	51	59
Tuesday	61	60	65	64
Wednesday	72	77	78	69
Thursday	89	80	81	79
Friday	91	90	99	95
Saturday	80	82	81	83

[12 Marks]

QUESTION 2

(a) Ranga Ramasesh is the operations manager for a firm that is trying to decide which one of four countries it should research for possible outsourcing providers. The first step is to select a country based on cultural risk factors, which are critical to eventual business success with the provider. Ranga has reviewed outsourcing provider directories and found that the four countries in the table that follows have an ample number of providers from which they can choose. To aid in the country selection step, he has enlisted the aid of a cultural expert, John Wang, who has provided ratings of the various criteria in the table. The resulting ratings are on a 1 to 10 scale, where 1 is a low risk and 10 is a high risk. John has also determined six criteria weightings: Trust, with a weight of 0.4; Quality, with 0.2; Religious, with 0.1; Individualism, with 0.1; Time, with 0.1; and Uncertainty, with 0.1.

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CULTURE SELECTION CRITERION	MEXICO	PANAMA	COSTA RICA	PERU
Trust	1	2	2	1
Society value of quality work	7	10	9	10
Religious attitudes	3	3	3	5
Individualism attitudes	5	2	4	8
Time orientation attitudes	4	6	7	3
Uncertainty avoidance attitudes	3	2	4	2

(i) Using the factor-rating method, which country should Ranga select?

[7 Marks]

(ii) Explain why Ranga should select this country?

[3 Marks]

(b) Construct a cause-and-effect diagram showing why a student might be dissatisfied with the cafeteria.

[10 Marks]

QUESTION 3

(a) A printing company estimates that it will require 1,000 reams of a certain type of paper in a given period. The cost of carrying one unit in inventory for that period is 50 cents. The company buys the paper from a wholesaler in the same town, sending its own truck to pick up the orders at a fixed cost of $20.00 per trip. Treating this cost as the order cost, compute the following;

(i) What is the optimum number of reams to buy at one time?

[3 Marks]

(ii) How many times should lots of this size be bought during this period?

[3 Marks]

(iii) What is the minimum cost (holding and setup) of maintaining inventory on this item for the period?

[4 Marks]

(iv) What is the total cost?

[2 Marks]

(b) How does revenue management impact an aggregate plan?

[8 Marks]

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QUESTION 4

(a) Montegut Manufacturing produces a product for which the annual demand is 10,000 units. Production averages 100 units per day, while demand is 40 units per day. Holding costs are $2.00 per unit per year, and setup cost is $200.00.

(i) If the firm wishes to produce this product in economic batches, what size batch should be used?

[3 Marks]

(ii) What is the maximum inventory level?

[3 Marks]

(iii) How many order cycles are there per year?

[3 Marks]

(iv) What are the total annual holding and setup costs?

[3 Marks]

(b) Which is the best lot-sizing policy for manufacturing organisations?

[8 Marks]

QUESTION 5

Read the following case and answer the given questions.

Finding a location for electronics component manufacturing in Asia

ACM is an electronics component manufacturer that has been located in Singapore since 1991, supplying original equipment manufacturers (OEMs) with quality components. In the past several years, ACM has experienced increasing pressure from other manufacturers located in other countries. In Singapore, while labour remains quite inexpensive, there has been a relatively steady increase in labour costs. In addition, utility costs—most notably water and energy costs—have led the firm to contemplate moving operations elsewhere in Asia in an attempt to make the firm more competitive. ACM remains profitable, but margins have shrunk, and management is interested in ensuring that the firm remains competitive against other component manufacturers in the medium term to long term.

A senior management team has formed a committee to reach a decision regarding possible relocation. The committee has identified two additional locations as possible candidates for relocation: Hong Kong (People's Republic of China [PRC]) and Kuching (Malaysia). Hong Kong's main attractions stem from the fact that since 1997, when its sovereignty was transferred back to the PRC, labour costs have decreased as access to labour has increased. Hong Kong enjoys a large seaport and very good transportation infrastructure, and this is important in moving in raw materials and moving out finished components to customers. Presently, the customers are geographically dispersed, making access to a seaport very important in delivering products to customers. Senior management believes that an increasing number of OEMs will move to the PRC in the next several years, as has been the case in the past decade. This will only increase the attractiveness of locating the manufacturing facility in Hong Kong.

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Kuching is located in the Malaysian province of Sarawak, on the island of Borneo. It is the fourth-largest city in Malaysia and home to a population of around 650,000. Several points make Kuching attractive to the relocation committee. First, locating here would provide access to natural resources and other production inputs. Second, the transportation infrastructure is good, and the city hosts a deep sea port for moving raw materials in and finished goods out. That said, the port is not as large or accessible as those of Hong Kong or Singapore, and several committee members have expressed concern about the frequency of ship visits to Kuching. If the port does not receive regular

service from container ships, transportation costs to ship components to OEMs will increase. Finally, another selling point is that labour is relatively stable and inexpensive in Malaysia.

The committee has contacted the government of Singapore to elicit possible incentives to not relocate to another country. Singapore is offering a 5-year exemption on taxes for ACM if the plant remains in Singapore. The government will also assist by partially subsidizing labour, water, and energy costs for 5 years. Committee members realize that the Singapore plant, which has been operating for years, has already been amortized, and opening a new plant would require additional capital costs. That said, opening a new factory would also provide an opportunity to upgrade production equipment to more productive and energy efficient alternatives.
(Source: Dr. Ian M. Langella, Shippensburg University, USA.)

Required

(a) What advantages and disadvantages does each potential location offer?

[6 Marks]

(b) What other relevant factors that are not mentioned in this case study might play a role in the team's decision?

[3 Marks]

(c) Why is transportation infrastructure so important in this decision?

[5 Marks]

(d) This is a long-term, strategic decision; what factors might change in the next 10 to 20 years? How will the possibility of such changes influence the decision?

[6 Marks]

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Formulas

$$Q^* = \sqrt{\frac{2DS}{H}}$$

$$N = \frac{D}{Q}$$

$$Ordering\ costs = \frac{DS}{Q^*} \quad Holding\ cost = \frac{QH}{2}$$

$$Q_p = \sqrt{\frac{2DS}{H\left(1 - \frac{d}{p}\right)}}$$

$$Maximum\ Inventory = Q\left(1 - \frac{d}{p}\right)$$

$$Average\ weekly\ demand = \frac{Total\ demand\ for\ the\ day\ each\ week}{Number\ of\ week(s)}$$

$$Average\ daily\ demand = \frac{Total\ average\ weekly\ demand}{Number\ of\ day(s)}$$

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